CLAIMS

1. Apparatus including a printhead for an inkjet printer, the printhead comprising:

an ink reservoir;

nozzles for ejecting ink from the ink reservoir onto print media, the nozzles being formed in the ink jet printer printhead in a predetermined fashion with bores purposefully shaped and/or directed to determine the formation and placement of satellite droplets when ink is ejected from the ink reservoir when the printhead is part of an inkjet printer.

2. The apparatus of claim 1, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) the printhead is used in a printer which prints in two directions, and

(d) the bore of each nozzle is shaped such that, when ink is ejected through the nozzles, satellite droplets and main drops are balanced - the combined area of satellite droplet and main drop in a first printing direction is as nearly equal as possible to the combined area of the satellite droplet and main drop in a second printing direction opposite to the first printing direction.

3. The apparatus of claim 2, wherein:

when ink is ejected through the nozzles, satellite droplets ejected through the nozzles at least partially overlap the main drops in each direction of printing.

4. The apparatus of claim 1, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) a second plurality of the nozzles have the axes of their bores aligned in a second direction,

(f) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality

of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

5. The apparatus of claim 1, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) when ink is ejected through the nozzles, each of the satellite droplets ejected through the first plurality of the nozzles is offset from the main drop ejected through the first plurality of the nozzles in substantially the same direction and at substantially the same distance.

6. The apparatus of claim 5, wherein:

each of the satellite droplets ejected falls within the area of a main drop, thus producing no additional satellite droplets on the media.

7. The apparatus of claim 5, wherein the inkjet print head travels laterally while printing, and the satellite droplets are laterally offset from the main drops.

8. The apparatus of claim 5, wherein the inkjet print head travels laterally while printing, and the satellite droplets are vertically offset from the main drops.

9. The apparatus of claim 8, wherein the satellite droplets are directed vertically enough to be separated from the main drop on the media.

10. The apparatus of claim 8, wherein printing laterally in either direction produces main drops and satellite droplets with nearly equal combined areas on the media.

11. The apparatus of claim 5, wherein:

(e) a second plurality of the nozzles have their axes of their bores aligned in a second direction,

(f) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second

plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

12. The apparatus of claim 5, further comprising an inkjet printer including the printhead, and wherein the inkjet printer includes means for printing in a single lateral direction so that the main drop and satellite droplet at least partially overlap.

13. The apparatus of claim 5, further comprising an inkjet printer including the printhead, and wherein the bores are aligned so that the main drop and satellite droplet ejected from substantially all of the nozzles at least partially overlap when the printer prints.

14. The apparatus of claim 1, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through each nozzle at a fire point,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) a second plurality of the nozzles have the axes of their bores aligned in a second direction,

(f) when ink is ejected through the nozzles, the main drops ejected through the first plurality of the nozzles are offset in a different direction from the fire point from which main drops ejected through the second plurality of the nozzles are offset from the fire point.

15. The apparatus of claim 1, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) a second plurality of the nozzles have the axes of their bores aligned in a second direction,

(f) a heater is used to eject ink through the nozzles, and each heater ejects ink through a first nozzle from the first plurality of nozzles and a second nozzle from the second plurality of

nozzles,

(g) the nozzles are aligned and directed such that when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles, such that:

in a first direction of printing, the main drop from the first nozzle associated with a heater at least partially overlaps the satellite droplet from that nozzle and at least partially overlaps the satellite droplet from the second nozzle associated with that heater, and

in a second direction of printing, the main drop from the second nozzle associated with a heater at least partially overlaps the satellite droplet from that nozzle and at least partially overlaps the satellite droplet from the first nozzle associated with that heater.

16. The apparatus of any prior claim, wherein the nozzle bores are oriented such that they eject ink opposite the direction of travel of the print head when the print head is moving and printing.

17. The apparatus of any prior claim, further comprising an inkjet print head comprising the inkjet print head chip.

18. The apparatus of claim 17; further comprising an ink jet printer comprising the inkjet print head.

19. The apparatus of any prior claim, wherein the printhead has large and small nozzles.

20. The apparatus of any prior claim, wherein the nozzle bores are formed in polyimide film.

21. The apparatus of any prior claim, wherein the nozzle bores are cut with an eximer laser.

22. A method of controlling the formation and placement of satellite droplets ejected from an ink jet printer printhead comprising the steps of:

providing an ink jet printer printhead having an ink reservoir;

forming nozzles in the ink jet printer printhead;

installing the printhead in an ink jet printer;

ejecting ink from the reservoir through the nozzles in the form of main drops and satellite droplets in a manner to achieve uniform density control by controlling the formation and placement of satellite droplets when ink is ejected from the reservoir of the ink jet printer printhead when the printhead is part of an inkjet printer.

23. The method of claim 22, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) the printhead is used in a printer which prints in two directions, and

(d) the bore of each nozzle is shaped such that, when ink is ejected through the nozzles, satellite droplets and main drops are balanced - the combined area of satellite droplet and main drop in a first printing direction is as nearly equal as possible to the combined area of the satellite droplet and main drop in a second printing direction opposite to the first printing direction.

24. The method of claim 23, wherein:

when ink is ejected through the nozzles, satellite droplets ejected through the nozzles at least partially overlap the main drops in each direction of printing.

25. The method of claim 22, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) a second plurality of the nozzles have the axes of their bores aligned in a second direction,

(f) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

26. The method of claim 22, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) when ink is ejected through the nozzles, each of the satellite droplets ejected through the first plurality of the nozzles is offset from the main drop ejected through the first plurality of the nozzles in substantially the same direction and at substantially the same distance.

27. The method of claim 26, wherein:

each of the satellite droplets ejected falls within the area of a main drop, thus producing no additional satellite droplets on the media.

28. The method of claim 26, wherein the inkjet print head travels laterally while printing, and the satellite droplets are laterally offset from the main drops.

29. The method of claim 26, wherein the inkjet print head travels laterally while printing, and the satellite droplets are vertically offset from the main drops.

30. The method of claim 29, wherein the satellite droplets are directed vertically enough to be separated from the main drop on the media.

31. The method of claim 29, wherein printing laterally in either direction produces main drops and satellite droplets with nearly equal combined areas on the media.

32. The method of claim 26, wherein:

(e) a second plurality of the nozzles have their axes of their bores aligned in a second direction,

(f) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

33. The method of claim 26, further comprising the step of providing an inkjet printer

including the printhead, and wherein the inkjet printer includes means for printing in a single lateral direction so that the main drop and satellite droplet at least partially overlap.

34. The method of claim 26, further comprising the step of providing an inkjet printer including the printhead, and wherein the bores are aligned so that the main drop and satellite droplet ejected from substantially all of the nozzles at least partially overlap when the printer prints.

35. The method of claim 22, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through each nozzle at a fire point,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) a second plurality of the nozzles have the axes of their bores aligned in a second direction,

(f) when ink is ejected through the nozzles, the main drops ejected through the first plurality of the nozzles are offset in a different direction from the fire point from which main drops ejected through the second plurality of the nozzles are offset from the fire point.

36. The method of claim 22, wherein:

(a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles,

(b) each nozzle includes a bore,

(c) each bore has an axis,

(d) a first plurality of the nozzles have the axes of their bores aligned in a first direction,

(e) a second plurality of the nozzles have the axes of their bores aligned in a second direction,

(f) a heater is used to eject ink through the nozzles, and each heater ejects ink through a first nozzle from the first plurality of nozzles and a second nozzle from the second plurality of nozzles,

(g) the nozzles are aligned and directed such that when ink is ejected through the nozzles,

satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles, such that:

in a first direction of printing, the main drop from the first nozzle associated with a heater at least partially overlaps the satellite droplet from that nozzle and at least partially overlaps the satellite droplet from the second nozzle associated with that heater, and

in a second direction of printing, the main drop from the second nozzle associated with a heater at least partially overlaps the satellite droplet from that nozzle and at least partially overlaps the satellite droplet from the first nozzle associated with that heater.

37. The method of any prior claim, wherein the nozzle bores are oriented such that they eject ink opposite the direction of travel of the print head when the print head is moving and printing.

38. The method of any prior claim, further comprising the step of providing an inkjet print head comprising the inkjet print head chip.

39. The method of claim 38, further comprising the step of providing an ink jet printer comprising the inkjet print head.

40. The method of any prior claim, wherein the printhead has large and small nozzles.

41. The method of any prior claim, wherein the nozzle bores are formed in polyimide film.

42. The method of any prior claim, wherein the nozzle bores are cut with an eximer laser.

43. The inventions substantially as shown and described herein.